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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/198,849 11/24/98 KANEYAMA

Y P/1929-47

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IM62/0313

EXAMINER

ELVE, M

ART UNIT

PAPER NUMBER

1725

DATE MAILED:

03/13/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.

09/198,849

Applicant(s)

Kaneyama

Examiner

M. Alexandra Elve

Group Art Unit

1725

☒ Responsive to communication(s) filed on Jul 3, 2000

☒ This action is **FINAL**.

☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire 3 month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claims

☒ Claim(s) 1-26 is/are pending in the application.

Of the above, claim(s) _____ is/are withdrawn from consideration.

☐ Claim(s) _____ is/are allowed.

☒ Claim(s) 1-26 is/are rejected.

☐ Claim(s) _____ is/are objected to.

☐ Claims _____ are subject to restriction or election requirement.

Application Papers

☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

☒ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☒ All ☐ Some* ☐ None of the CERTIFIED copies of the priority documents have been

☒ received.

☐ received in Application No. (Series Code/Serial Number) _____.

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

☐ Notice of References Cited, PTO-892

☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). _____

☐ Interview Summary, PTO-413

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

--- SEE OFFICE ACTION ON THE FOLLOWING PAGES ---

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DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP(I) (197112 Abstract) in view of Sliwa, Jr. (US Pat. 4,990,462) and Sherry (US Pat. 4,763,829).

JP(I) discloses a mounting method in which a eutectic alloy solder is used to join semiconductor elements to a substrate whereby the soldering is conducted while immersed in an inactive liquid (vapor), thus eliminating oxidation effects JP(I) does not teach the joining of optical devices, semiconductor or ceramic substrates, printed circuit boards, electrodes, the use of ultrasonic vibration, the breaking of surface oxides or specifically the use of a liquid media.

Sliwa, Jr. discloses the use of liquid surface tension to aid in assembly of integrated circuits, optoelectronic devices, with ceramic and semiconductor substrates (abstract; col. 21-22, lines 66-68 & 1-5 and col. 23, lines 16-26). Additionally, it is noted that the one of key mechanisms of the liquid with respect to assembly are the ability of the liquid to render mating segments coplanar in preparation for joining. This is done by a configuration which seeks the minimum surface tension (col. 13, lines 33-47). The liquid agent helps control the assembly action

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forces acting on the segments via. surface tension and viscosity selection to minimize mechanical damage (col. 16, lines 40-68). Flotation liquids may be water, methyl or iso-propyl alcohol, molten indium or other low melting point metals and so forth (col. 18, lines 65-69).

The mother substrate may be a semiconductor, metal or insulation material such as glass or ceramic and may disposed on its surface any desirable combination of receptacle segments and conventional hybrid-style components and interconnects (col. 23, lines 16-21). Additionally, conventional solder bumps are shown on flip-chips (col. 23, lines 42-45).

It would have been obvious to one of ordinary skill in the art at the time of the invention to substitute liquid, as taught by Sliwa, Jr., for the JP(I) vapor because they are functional equivalents in terms of carrier media.

It would have been obvious to one of ordinary skill in the art to use semiconductors, optical devices, semiconductor or ceramic substrates, printed circuit boards and electrodes as taught by Sliwa, Jr. because these are merely varieties of semiconductor elements and substrates as used by JP(I).

Sherry discloses a technique for providing solder bumps to electronic components, such as silicon chips, chip carriers and circuit boards. Solder is applied to the surface along with ultrasonic energy so that the solder wets thoroughly (abstract). That is, a wafer is dipped into solder and at the same time ultrasonic energy is applied to the solder by a commercially available ultrasonic horn (col. 3, lines 4-13). The ultrasonic energy serves to break down the surface tension of the solder, thus permitting the solder to penetrate the openings in the mask and wet the exposed pads.

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Ultrasonic energy also aids in breaking up any oxide on the pad surfaces, thus eliminating the need for a fluxing operation (col. 3, lines 15-21).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use ultrasonic energy for solder bonding as taught by Sherry to the JP(I) soldering operation because it ensures the integrity of the solder joint.

Response to Amendment

3. Upon carefully reviewing Applicant's arguments filed July 3, 2000 the Examiner acknowledges the amendments to claims 1-13 and the addition of claims 20-26. The claim objection of claim 10 is withdrawn in view of applicant's amendments. The 112 second paragraph rejections are withdrawn in view of applicant's amendments.

4. Applicant's arguments filed July 3, 2000 (paper # 9) have been fully considered but they are not persuasive.

Applicant argues that JP(I) discloses dipping the semiconductor into the vapor and hence differs from instant claims. The examiner respectfully disagrees because JP(I) states that the mounting method uses a eutectic system solder for semiconductor elements whereby the supporting eutectic alloy is immersed in an inactive solvent and the elements are joined to the substrate.

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The applicant argues that the vapor does not support the structure buoyantly. The examiner respectfully notes that Sliwa, Jr., teaches the use of a liquid. Additionally, the 35 USC 103 claim rejections were based on a combination of art, that is, instant claims were unpatentable over JP(I) (197112 Abstract) in view of Sliwa, Jr. and Sherry. Unobviousness cannot be established by attacking the references individually when the rejection is based on a combination of references. In re Novak 16 USPQ 2d 2041, 2043 (Fed. Cir., BPAI 1989); In re Merck & Co. 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986); In re Keller 208 USPQ 871 (CCPA 1981); *Ex parte Varga* 189 USPQ 204; *Ex parte Campbell* 172 USPQ 91; In re Scheckler 168 USPQ 716 (CCPA 1971); In re Young 159 USPQ 725; In re Lyons 150 USPQ 741.

Conclusion

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period

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will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. JP(II) (3060134A, Abstract) & JP(III) (16902, Abstract).

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to M. Alexandra Elve whose telephone number is (703) 308-0092. The examiner can normally be reached Monday to Friday from 6:30 AM to 3:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Dunn, can be reached on (703) 308-3318. The fax number for the group is (703) 872-9386.

Any inquiry of general nature to the status of this application or proceeding should be directed to the group receptionist whose telephone number is (703) 308-0661.


M. Alexandra Elve
Patent Examiner
Technology Center 1700

March 9, 2001